AMENDED CLAIMS

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[Claims 1-8 amended, claim 9 cancelled, claims 11,13, 16 added]

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DECLARATION

1) Product consisting in a sample containing at least one kind of isomer nuclides characterized:

- in that groups of two or several excited nuclei of the aforesaid isomer nuclides of the aforesaid sample, are entangled between them, the aforementioned sample being called thereafter by convention the “entangled” sample, and presenting quantum coupling between some of the excited nuclei of the aforesaid nuclides,

- and, in that the measurable half-life on at least one excited isomer nuclide of the “entangled” sample, during its natural deexcitation, is variable, due to the quantum coupling between entangled excited nuclei of the aforesaid nuclide, the initial half-life of the aforesaid nuclide being lower than the theoretical half-life of the aforesaid nuclide, and the value of the half-life of the aforesaid nuclide varying from the value of the initial half-life to the value of the theoretical half-life of the aforesaid nuclide, then increasing beyond the value of the aforesaid theoretical half-life,

2) Product according to claim 1 characterized in that it includes an “entangled” sample containing excited nuclei of at least one kind of isomer nuclides having at least one metastable state with a duration of half-life from one microsecond to 50 years, for example, Niobium (93Nb41m), Cadmium (111Cd48m), Cadmium (113Cd48m), Cesium (135Ce55m), Indium (115In49m), Tin (117Sn50m), Tin (119Sn50m), Tellurium (125Te52m), Xenon (129Xe54m), Xenon (131Xe54m), Hafnium (178Hf72m), Hafnium (179Hf72m), Iridium (193Ir77m), or Platinum (195Pt78m), and some radioactive isotopes.

3) Product according to claim 1 characterized in that it includes an “entangled” sample, in any physical or chemical form, for example in the form of solid in sheet or powder, or

in the form of fluid or gas (case of Xenon for example), said "entangled" sample containing a proportion of one or several isotopes, for example, Niobium (93Nb41m), Cadmium (111Cd48m), Cadmium (113Cd48m), Cesium (135Ce55m), Indium (115In49m), Tin (117Sn50m), Tin (119Sn50m), Tellurium (125Te52m), Xenon (129Xe54m), Xenon (131Xe54m), Hafnium (178Hf72m), Hafnium (179Hf72m), Iridium (193Ir77m), Platinum (195Pt78m), or of alloys, the mixtures, or the chemical compounds incorporating a proportion of one or several of the aforesaid isotopes.

4) Product according to claim 1 characterized in that the "entangled" sample underwent a physical and/or a chemical transformation after its manufacture.

5) Product according to claim 1 characterized in that the measurable value of the initial half-life of at least one of the aforesaid excited isomer nuclides of the "entangled" sample is strictly lower than the theoretical half-life of the aforesaid nuclide, for example ranging between 10% and 100% of the theoretical value.

6) Product according to claim 1 characterized in that the "entangled" sample contains at least two excited isomer nuclides.

7) Product according to claim 1 characterized in that the "entangled" sample contains at least one excited isomer nuclide in at least two metastable states.

8) Manufacturing process of the product according to the claim 1 in which one uses amongst other things:

- at least one kind of isomer nuclide,
- irradiation by gamma rays,

characterized in that:

- one prepares a sample containing nuclei of at least one isomer nuclide having at least one metastable state, by irradiation by means of gamma rays at least partly entangled, of a sufficient energy to excite certain of the aforesaid nuclei of the isomer nuclide in at least one metastable state, the aforementioned entangled gamma rays being generated, for example, either by a source of gamma rays emitted in a cascade, or by a generator of gamma rays coming from the Bremsstrahlung of accelerated particles, the aforementioned groups of gamma rays, when they are entangled, exciting the aforementioned corresponding nuclei of the

aforesaid isomer nuclide distributed in the aforementioned irradiated sample that is produced, qualified in the continuation by convention “entangled” sample.

9) Method according to claim 8 characterized in that the initial half-life of the aforesaid product obtained varies with the duration of irradiation and the power of the source of gamma irradiation.

10) Use of the product according to any of claims 1, 2, 3, 4, 5, 6 or 7 characterized in that one employs the gamma radiation, emitted by natural deexcitation of the aforementioned “entangled” sample, as a source initially emitting a high dose of radiation, then a decreasing dose, and followed by a low dose of radiation for a long time, to irradiate the environment of the “entangled” sample.

11) Use according to claim 10 characterized in that one employs an “entangled” sample to conduct one or more physicochemical reactions.

12) Use according to claim 10 characterized in that one employs an “entangled” sample in the form of a solution.

13) Use according to claim 10 characterized in that one employs an “entangled” sample having undergone a physical transformation or a chemical conversion after its manufacture.

14) Use of the product according to claim 6 characterized in that one employs a gamma radiation with at least two lines of different energies emitted by at least two nuclides to irradiate the environment of the “entangled” sample.

15) Use of the product according to claim 7 characterized in that one employs a gamma radiation with at least two lines of different energies emitted by the same nuclide to irradiate the environment of the “entangled” sample.

16) Product according to anyone of claims 1, 2, 3, 4, 5, 6 or 7 for a medical use.

In order to cure the difficulties encountered at the time of the international search in the written opinion of the administration in charge of international search, the claims have been amended as follows:

- Claim of method 1 divided into amended claim of product 1 and amended claim of manufacturing process 8;
- Claim of method 2 replaced by amended claim of product 2;
- Claim of method 3 divided into amended claims of product 6 and use 14;
- Claim of method 4 divided into amended claims of product 7 and use 15;
- Claim of method 5 replaced by amended claim of product 5;
- Claim of method 6 replaced by amended claim of product 3;
- Claim of method 7 replaced by amended claim of use 12;
- Claim of method 8 replaced by amended claim of product 4;
- Claim of device 9 cancelled;
- Claim of use 10 amended;
- New claims 11, 13 and 16 added.

Claim 1 as filed, by grouping the steps of the method of preparation and exploitation of the intermediate product made of the “entangled” sample including nuclei, excited and entangled, of at least a kind of isomer nuclide, presenting a quantum coupling, and by positioning the step of preparation in the non characterizing part of the claim, could induce in the mind of the reader a confusion between the step of excitation and of the step of exploitation of the product by natural deexcitation, which does not include X ray stimulation, and which are of different and separate natures in time; the step of exploitation of the product by a natural deexcitation, characterized by a variable half-life of at least one nuclide, is transferred in the claim of use 10.

The claim of product 1 characterizes the product made up of an “entangled” sample in which was induced the typical property of the quantum mechanics of local entanglement between excited nuclei of isomer nuclides of the aforesaid sample. The radioactive products obtained then, have a variable half-life of natural deexcitation due to the coupling between entangled nuclides. The entangled nuclides are deexcited simultaneously together, which reduces the initial half-life of the “entangled” sample.

Claim 8 characterizes a manufacturing process of the product according to claim 1, which teaches to the expert means necessary and sufficient to be implemented for

obtaining the aforesaid product, in particular the irradiation by means of gamma rays, at least partly entangled, with a sufficient energy to excite some of the nuclei of one isomer nuclide in at least a metastable state, applied to a sample. This technique differs from the techniques usually used for obtaining excited isomer nuclides, these other techniques not inducing the typical property of entanglement between excited nuclei of nuclides contained in a sample, and its consequence in term of variability of the half-life of natural deexcitation of the entangled excited nuclei of nuclides.

Claim 10 characterizes a use of a product according to any of the claims 1 to 7 in which the “entangled” sample is used as source initially emitting a high dose of radiation, then a decreasing dose, and followed by a low dose of radiation for a long time, this gamma radiation being the result of the natural deexcitation of the “entangled” sample, and allowing to irradiate the environment of the “entangled” sample: it teaches the expert the means necessary and sufficient to exploit the aforementioned “entangled” sample of the aforesaid product as a radiation source.
Contrary to the method used in references XP-002304655 or XP-008038352, it is made during this exploitation, neither use of an additional gamma excitation, nor the use of an X-ray stimulation.
The claimed product is characterized by a variation of the half-life, of the natural deexcitation of the entangled excited nuclei of nuclides, durable in time, whereas the isomer nuclide products described in XP-002304655 or XP-008038352 are characterized by an instantaneous accelerated deexcitation (“prompt”), non-durable to a significant degree during time, using a stimulation by X-rays of less than 300 keV or of less than 30 keV according to the reference.

At the date of the invention, the expert was not informed, nor has the use of the product made of “entangled” sample, that said sample could be used as a source initially emitting a high dose of radiation, then a decreasing dose, and followed by a low dose of radiation for a long time.

Claim 15 is added to separately claim the products for medical applications.

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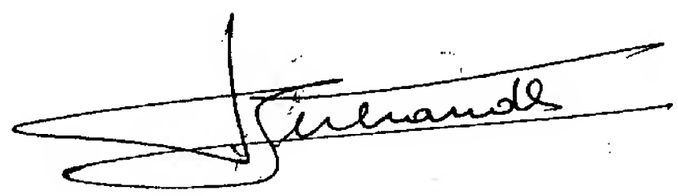

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